

ABSTRACT

A multistage axial-flow pumping or marine propulsion device having fixed or variable pitch stators between rotors. Stator vanes are designed to lower internal fluid speed without sacrificing total pressure as working fluid travels toward the discharge nozzle. A variable pitch stator controls the amount of energy, i.e., torque, imparted to the working fluid at successive rotor sections. A variable inlet guide vane provides throttling of mass flow rate independently of rotor speed. An exit guide vane provides flow straightening and pressure maintenance at the discharge nozzle. A variable area throat at the discharge nozzle controls the exit velocity of the water jet according to boat speed and/or desired propulsive efficiency. Advantageously, the device enables a shipmaster to set performance characteristics of a vessel at any desired speed, loading, horsepower setting, or operating characteristic of the power plant.